MODULE 4–EUROPEAN VEHICLE MAKERS

A-2v: Video: Tech-Trends Trivia
This vehicle maker's logo represents the company's motors use in land, air, and sea. (pause) Mercedes-Benz

A-4v: Video: Aluminum On BMW ActiveHybrid 5
(HOST) The 2013 ActiveHybrid 5 is based on the BMW 5 Series. While it is primarily steel construction, there is a large amount of aluminum used. We spoke with David Buchko from BMW on this subject.

(DAVID BUCHKO) All of our BMW 5 Series cars use an extensive amount of aluminum for light weight, balanced with a lot of high-strength steel for overall structural integrity of the vehicle and stiffness. In the new 5 Series car, a lot of the aluminum up front includes the fenders, the hood, the shock towers under the hood as well. And then of course other parts of the car like the doors, are also made of aluminum, non-structural parts of the car, to sort of balance things out. Even the beams inside the doors of the car are made of aluminum for light weight and strength.

One of the things that makes this unique, and the reason that we're now doing aluminum doors, it lightens the car overall and that's important. But for example, these kinds of complex contours in the doors, where the door handles are, they look really nice, but with the doors being made of aluminum years ago, the technology to press this door with that contour didn't exist. We're able to do that now. We're able to incorporate that, have the aluminum doors without compromising the design of the car and the overall style.

The other thing that BMW does with the 5 and a lot of our models is to use an extensive amount of aluminum in the suspension, both in the front and in the rear. That gives us multiple benefits. It helps us to lower the weight of the vehicle overall, but it also lowers the unsprung weight of the vehicle, the weight that goes up and down with the wheels as they go down the road. That of course improves ride quality and handling responsiveness, so you get double benefits.

(HOST) The weight savings made possible by the extensive use of aluminum is even more important on this vehicle than on the regular 5 Series sedan, as this, and the smaller Active 3, are BMW's first full hybrids.

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B-1v: Video: Tech-Trends Trivia
The colors in this vehicle brands logo represent the flag from the region of their home country, not the national flag. (pause) BMW

C-1v: Video: Mercedes-Benz SL
The Mercedes-Benz SL 550 is the first Mercedes-Benz with an aluminum-intensive structure made from 90% aluminum, making it 275 pounds lighter than its predecessor. There is stamped sheet aluminum, vacuum die casting, high-pressure casting, and extrusions. The parts are MIG welded, screwed, riveted, bolted, and bonded together. The SL's aluminum chassis has extruded aluminum panels rather than sheet metal to form the floor. This allows for greater strength in the floor, which is critical for a vehicle with no roof. With traditional MIG welding methods, the panel would warp during the structural assembly process. For this reason, friction stir welding was used. Friction stir welding cannot be duplicated in the repair facility. Other materials used on the SL 550 include magnesium and steel. The A-pillars and front roof crossmember are made from high-strength steel.

D-1v: Video: Aluminum On The Porsche 911 Carrera
Porsche completely redesigned the 911 Carrera for the first time in 15 years. The most interesting feature on the redesign from a body point of view is the combination of aluminum and steel. By adding aluminum, Porsche was able to increase the size of the passenger compartment, yet reduce the overall weight of the vehicle.

Basically, the side structure and other reinforcements are steel, along with the roof crossmember. This includes boron-alloyed steel on the A-pillar, B-pillar, and roof rail reinforcements. The entire front structure is aluminum, as well as the floor pan, roof, fenders, and closure panels.

Magnesium is also used for the instrument panel crossmember and the center console structure.

One of the biggest challenges when it comes to combining aluminum with steel and magnesium, is joining the different types of metals. For that purpose, self-piercing rivets, flow drill screws or E-jots, combined with adhesive is used extensively by Porsche.

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E-4v: Video: Tech-Trends Trivia

What is the origin of the Volvo logo? (pause) The Volvo logo is the Roman symbol for iron.

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